

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 April 2004 (29.04.2004)

PCT

(10) International Publication Number
WO 2004/035222 A3

(51) International Patent Classification⁷: **B05B 1/28**

(21) International Application Number:
PCT/US2003/032462

(22) International Filing Date: 14 October 2003 (14.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/418,902 15 October 2002 (15.10.2002) US

(71) Applicant (for all designated States except US): **SPRAY-
ING SYSTEMS, CO.** [US/US]; North Avenue at Schmale
Road, P.O. Box 7900, Wheaton, IL 60189-7900 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **HUFFMAN, David,**
C. [US/US]; 60 Amherst Road, Merrimack, NH 03054
(US).

(74) Agents: **BAYS, Gregory, C. et al.;** Leydig, Voit & Mayer,
LTD., Suite 4900, Two Prudential Plaza, 180 North Stetson,
Chicago, IL 60601-6780 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR,
KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK,
MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT,
RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR,
TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

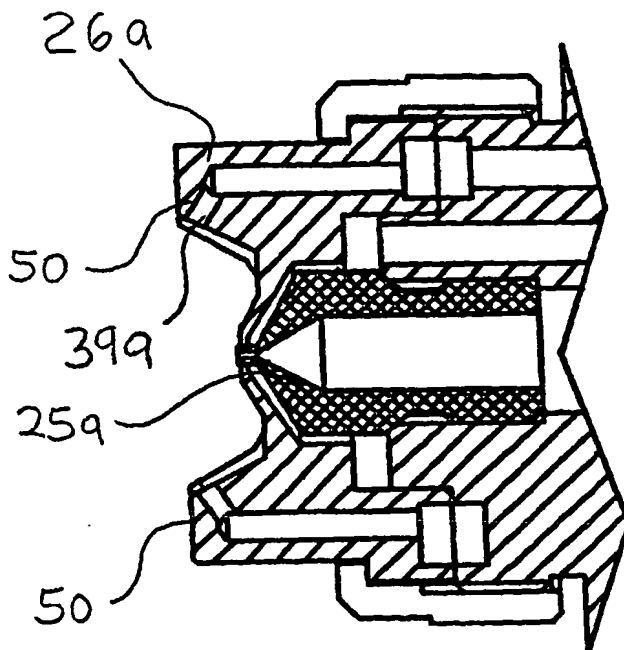
Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
3 June 2004

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: **EXTERNAL MIX AIR ASSISTED SPRAY NOZZLE ASSEMBLY**



(57) Abstract: A spray device comprising a body having a liquid discharge passage and a spray nozzle assembly affixed to the body is provided. The spray nozzle assembly includes a liquid spray tip for directing liquid from the liquid passage in the body into a predetermined spray pattern and an atomizing fluid cap. The liquid spray tip includes a forwardly extending nose portion that defines a liquid discharge orifice. The nose extends through a central opening in the air cap thereby defining an annular atomizing fluid discharge orifice that communicates with an atomizing fluid inlet. The nose extends in a downstream direction past the central opening in the air cap such that the liquid discharge orifice is arranged at least approximately 2mm. downstream of the annular atomizing fluid discharge orifice.

WO 2004/035222 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/32462

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B05B 1/28

US CL : 239/291, 290, 292

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 239/291, 290, 292

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2,504,117 A (DOWNS) 18 APRIL 1950 (18.04.1950), see the entire document.	1-10
Y	US 3,873,023 A (MOSS et al) 25 MARCH 1975 (25.03.1975), see the entire document.	1-10
Y	US 5,322,221 A (ANDERSON) 21 JUNE 1994 (21.06.1994), see the entire document.	1-10

☐

Further documents are listed in the continuation of Box C.

☐

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

18 March 2004 (18.03.2004)

Date of mailing of the international search report

12 APR 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Dinh Q Nguyen

Telephone No. 703-305-0248